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10/782,209

02/19/2004

Bhavani Raghuraman

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SCHLUMBERGER-DOLL RESEARCH  
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EXAMINER
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GAKH, YELENA G

ART UNIT	PAPER NUMBER
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1797

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12/13/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/782,209	<b>Applicant(s)</b> RAGHURAMAN ET AL.	
	<b>Examiner</b> Yelena G. Gakh, Ph.D.	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) 1-26 and 44-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>02/19/04, 10/24/05</u> | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Election of Group II and species II, i.e. claims 27-43, with traverse, filed on 10/18/07, is acknowledged. Amendment to claim 1 raises an issue of further restriction requirement between Claims 1-5 and Claims 6-9 (former Group I), because "means for mixing formation fluid with the reagent mixture downhole", as recited in claim 6, *vs.* "means for mixing formation fluid with the reagent mixture" e.g. on the surface, as recited in claim 1, are different and require different search. However, the examiner does not raise this issue in the present Office action, since Group II has been elected.

In response to the Applicants' traverse of the restriction requirements, the examiner would like to indicate that, first, Group II, claims 10-43, is not directed toward any application of the method for a formation fluid, less so to its application to the downhole analysis. On the contrary, the method recited in claims 10-43 is directed toward the method of making a reagent mixture for determining pH of **a sample** (not a formation fluid sample), and does not require any apparatus comprising mixing pH reagents with the formation fluid. Not only has been the method classified in a different class than the claims of Group I (class 436, *vs.* class 422, respectively), but also it does not require any search in the art of analysis of formation fluids. The examiner believes that this is a sufficient basis for indicating a serious burden for the examiner to search for both groups of claims.

Regarding restriction of species, i.e. the reagent mixture capable of detecting a pH range broader than each reagent individually (Claims 1-5 and 10-26) and the reagent mixture capable of detecting pH at a higher accuracy than each reagent individually (Claims 1-5 and 27-43), the examiner believes that instant specification itself provides a basis for such restriction. In fact, the specification in paragraph [0008] discloses: "A *commonly used* pH indicator uses a mixture of reagents *to extend the range of pH* measurement [i.e. "capable of detecting a pH range broader than each reagent individual", *Ex.*]. Further disclosure emphasizes that finding mixtures which allow *more accurate* detection is non-obvious over the prior art. Thus, not only the Applicants discern between these species, but they also indicate, that while the first species is conventional in the art, the second one is novel and non-obvious. (Claims 10-26 do not recite in any

way the accuracy of the measurements). Also, in paragraph [0013] the specification discloses: "a mixture of two or more reagents wherein the reagent mixture is capable of detecting **either**: (1) a pH range **broad**er than each reagent individually or (2) pH **more accurately** than each reagent individually". Thus, searching for reagent mixtures effective in a broader pH range does not require search for the reagent mixtures capable of more accurate measurements. Also, claims 10-26 have other issues regarding 112, first and second paragraph requirements, than claims 27-43.

Therefore, the restriction requirements are proper and are made FINAL.

The Examiner's Note: the examiner did not quite understand, how amendment of claim 1 by removing the limitation "downhole", made claims 10-26 and 27-43 readable on species II (Applicants' statement on page 14)? The examiner withdraws claims 1-26 and 44-55 from consideration. Claims 27-43 are considered on merits.

#### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 27-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no way for a person of ordinary skill in the art to first create a reagent mixture comprising known reagents in known quantities, with each reagent having a known thermodynamic acid dissociation constant, and then to optimize this reagent mixture by changing all parameters of the mixture, including the reagents (with their respective acid dissociation constants) and their quantities, in order to get the desired pH range. The examiner believes that the recitation of claim 1 and corresponding disclosure in the specification do not correctly reflect the essence of the method of the application. To the examiner's understanding, according to the detailed description of the specification, it is the second step of identifying the mixture of the

reagents, which would be capable of detecting pH with higher accuracy that requires optimization of the components of the mixture and their quantities. There is no way for a person of ordinary skill in the art to optimize reagents on the basis of their acid dissociation constants ( $pK_a$ ) as recited in claim 28, if the reagents with their constants are predetermined by the second step. The disclosure does not enable the method recited in the presently pending claims.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 27-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

From claim 27 it is not apparent, as to how it is possible first to create a reagent mixture, which is capable of detecting pH at a higher accuracy than each reagent individually, with the mixtures comprising known reagents in known proportions, and then to optimize this well defined composition by changing reagents and their concentrations? The third step of the method recited in claim 27 obviously contradicts the second step, which renders claim 27 and all depend claims unclear and indefinite.

Claim 28 recites "optimizing by identifying". It is not apparent, as to how it is possible to "optimize" the prepared reagent mixture by identification of reagents.

From claim 30 it is not apparent, as to how it is possible to optimize the reagent mixture by identifying optimal spectral channels. The reagent mixture is just a mixture of certain compounds in specific proportions. It is not apparent, as to how optical channels can optimize the reaction mixture. The examiner believes that this should be "detection of pH" using a certain reagent mixture that can be optimized by optimizing spectral channels.

Claims 30, 34, 35-41 recite spectral channels and optical density ratios, while the parent claims do not recite any spectral analysis, which makes it unclear, as to which spectral channels and optical densities the claims refer to.

Claims 30, 34, 35-41 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: spectral measurements of reagent mixtures, which are necessary for performing the method recited in the indicated claims.

Claims 33 and 42 recite "performing error analysis" without any reference, as to which error analysis the claims refer to. Claim 27 does not recite any measurement, and therefore it is not clear, as to where the errors can be found. Claim 39 (the parent claim for claim 42) depends on claims 38 and 37, which recite dissociation constants of the reagents, relative quantities of the reagents, two or more optical channels, and optical densities. Which specific measurements are meant in claims 33 and 42, for which the error analysis should be performed? The recitations of the claims are unclear and indefinite.

Since the examiner cannot apply any art rejection to the presently pending claims, the examiner interprets the subject matter of the claims as she understands it from the specification, i.e. that the method comprises the steps of optimizing reagent mixtures for determining pH at a higher accuracy than each reagent individually within the predetermined pH range by identifying appropriate reagents via their acid dissociation constants, or by optimizing the reagents concentrations, or by optimizing the spectral wavelength for detecting pH. Since the presently pending claims do not recite this subject matter, the examiner applies only potential prior art rejections. If the examiner's interpretation of the subject matter recited in the claims is incorrect, the examiner respectfully requests the Applicants to clarify the essence of their method.

#### ***Potential Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 27-42** are rejected under 35 U.S.C. 102(b) as being anticipated by King et al. (Appl. Spectr., 1990, IDS).

In respect to claim 27 King et al. teach using multiple indicators in application to pH measurements: "in this paper we present a general equation which can be used to calculate pH from absorbance measurements [optical channels, optical densities - *Examiner*] of a solution containing one or more indicators" (page 722, right column). King et al. further indicate: "A model has been developed which can describe the visible spectra of five sulfonephthalein indicators (thymol blue, bromophenol blue, bromocresol green, bromocresol purple and phenol red) as a function of pH. The model was used to optimize a two-indicator system containing bromocresol green and phenol red, which was used to measure seawater pH over the range 3.0 to 8.2 during alkalinity titration" (*ibid.*).

The model uses identifying optimal pKa of the reagents (Claims 28, 35) (see Abstract), optimal spectral channels (Claim 30) and relation between optical density ratios and pH (Claims 31-32) (see page 722, right column and page 723, left column), performing an error analysis (Claims 33 and 42) (see the whole page 726, Curve Fitting Parameters and Prediction of Multiple Indicator Spectra). "The model facilitates selection of optimal measurement wavelengths and concentrations of multiple indicator systems" (Claims 29, 34, 36-41).

King et al. specifically indicate: "The selected wavelengths provide maximum pH measurements sensitivity over the pH range 8.3 to 6 and 5 to 3" (page 727, right column). Since the model includes optimization of pKa, error analysis and optimization of the reagent concentrations for the same purpose, the model is developed for achieving maximum sensitivity (accuracy) for pH measurements.

6. **Claims 27-42** are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (Anal. Chim. Acta, 2000, IDS).

Lin et al. teach a method of making a sensor comprising identifying a target pH range, mixing multiple pH indicators to obtain a better accuracy, than individual reagents ( $\Delta\text{pH} = \pm 0.03$ ), and optimizing the reagent mixture by determining the algorithm for reagents pKa (Claims 27-28) (see page 51, paragraph 3.1.1.  $\Delta\text{pKa}$  between indicators). Optimization also includes optimization concentrations of indicators (Claim 29) and

selection of optimal optical channels (Claims 30, 34-35) (see pages 52, 3.1.3. Concentrations of indicators, and page 53, 3.2. A Mixture of four indicators, respectively).

7. **Claims 27 and 30** are rejected under 35 U.S.C. 102(b) as being anticipated by Baldini et al. (Sensors and Actuators B, 1995).

Baldini et al. teach a method of making a reagent mixture for determining the pH of a sample, comprising: identifying a target pH range (pH 1.0-8.0) (Abstract), mixing known relative quantities of two reagents to create the reagent mixture which is capable of detecting pH at a higher accuracy than each reagent individually (precision of 0.1 pH), page 164, right column) and optimizing detecting selected pH range by identifying two optimal spectral channels (page 165, left column, "2.2. Optical instrumentation"), which characterize the set of the reagents.

#### ***Potential Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under



37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. **Claim 43** is rejected under 35 U.S.C. 103(a) as being unpatentable over King et al. While King does not specifically indicate optimizing an absolute concentration of the reagent mixture in error analysis, optimizing the concentration of the reagent is a conventional procedure in analytical spectroscopy, and therefore it would have been obvious for any person of ordinary skill in the art to perform this step for decreasing error in error analysis performed by King et al..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

12/2/2007

  
**YELENA GAKH**  
**PRIMARY EXAMINER**